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(54) Abstract Title

**Displaceable slideway for a carding machine**

(57) An arrangement at a carding machine for adjusting the position of card top bars 14 relative to the clothing 4a of the carding cylinder 4 has first 20 and second 23 curved slideways, the ends of the card top bars 14 being slidably moveable on the slideways 20,23 with the second slideway 23 which is of tapered configuration being displaceable in the circumferential direction relative to the cylinder 4. The card top clothings may form an adjustable angle  $\alpha$  with the cylinder clothing 4a. At each card top end there may be two pin shaped slide elements 14b<sub>1</sub>, 14b<sub>2</sub>. There may be a displacement device comprising an adjustment element and a drive device for the localized displacement of the second slideway 23.

Fig. 3b

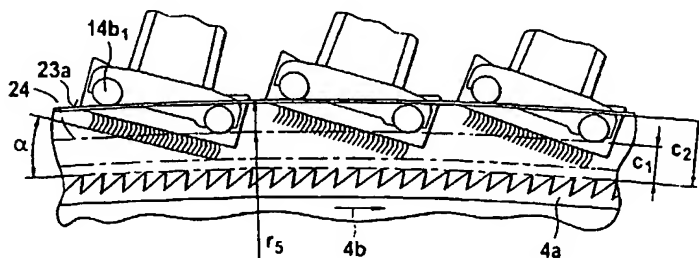
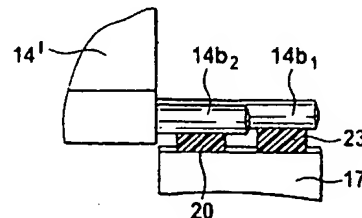


Fig. 5a



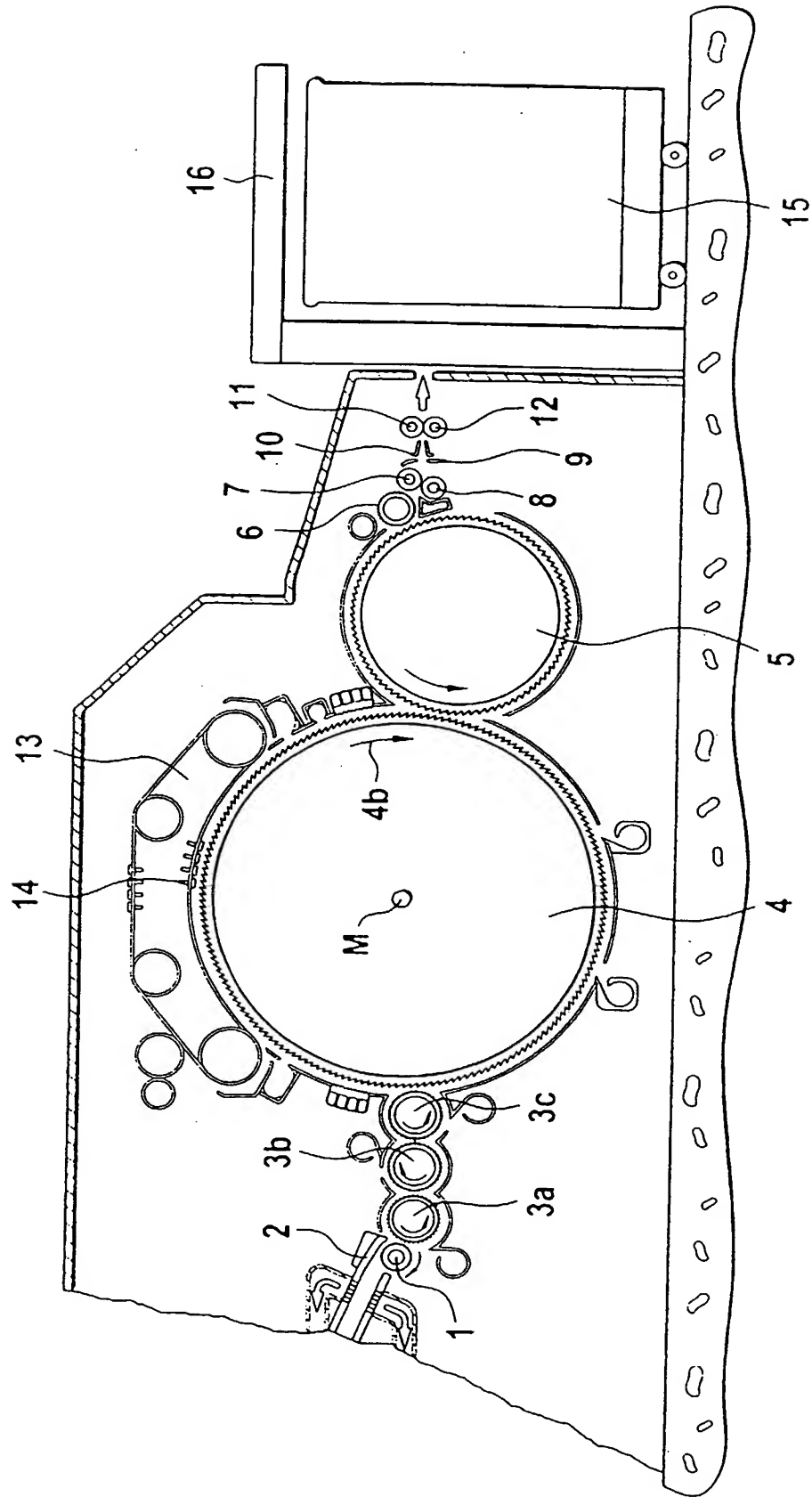
At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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Fig. 1



A vertical line with a horizontal line intersecting it. The intersection point is labeled 'C'.

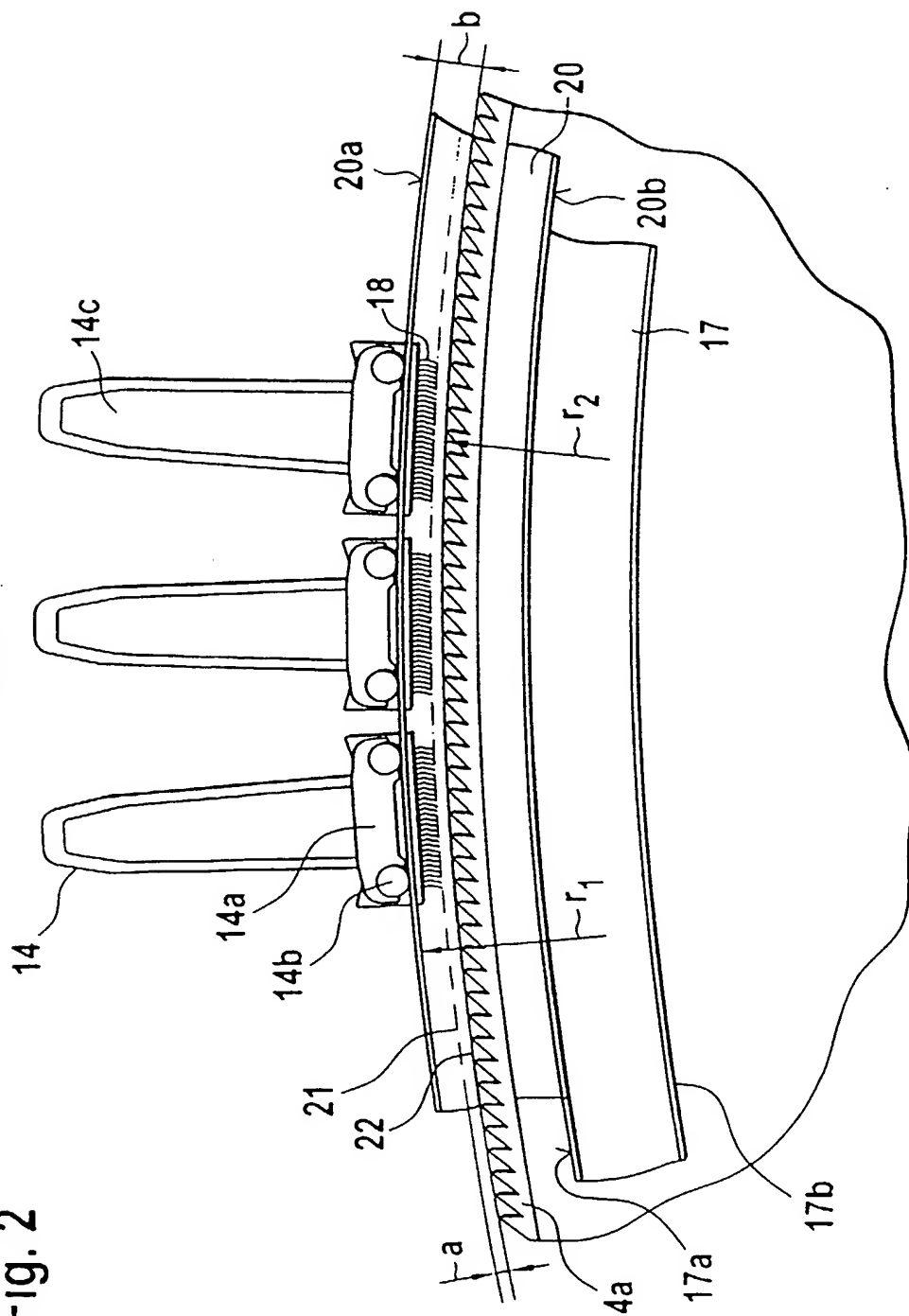




Fig. 4a

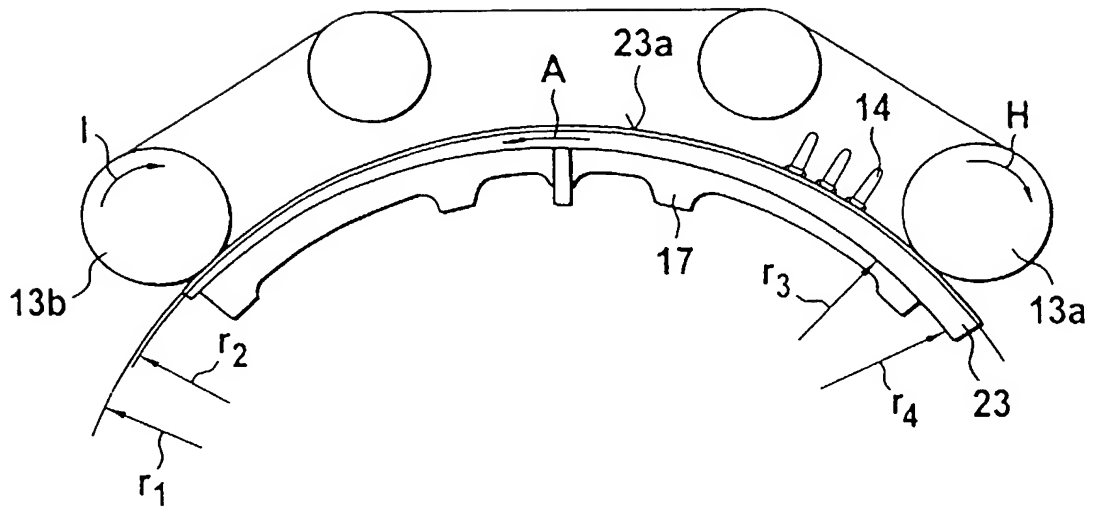


Fig. 4b

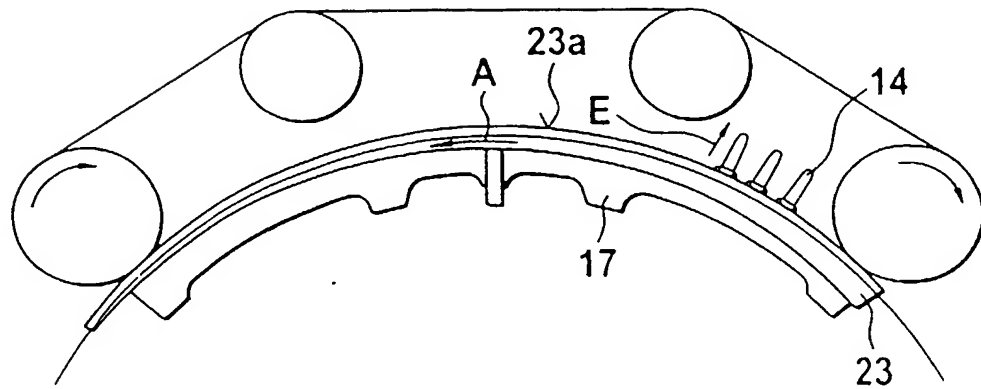


Fig. 5a

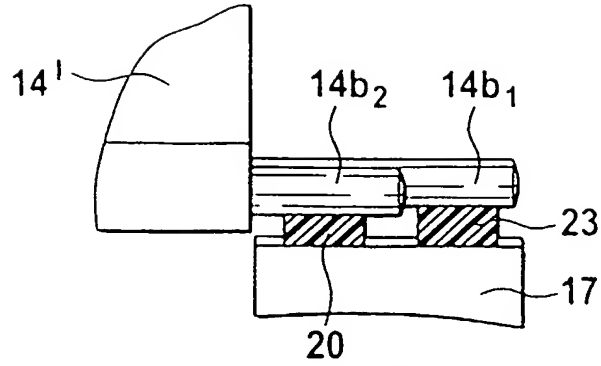


Fig. 5b

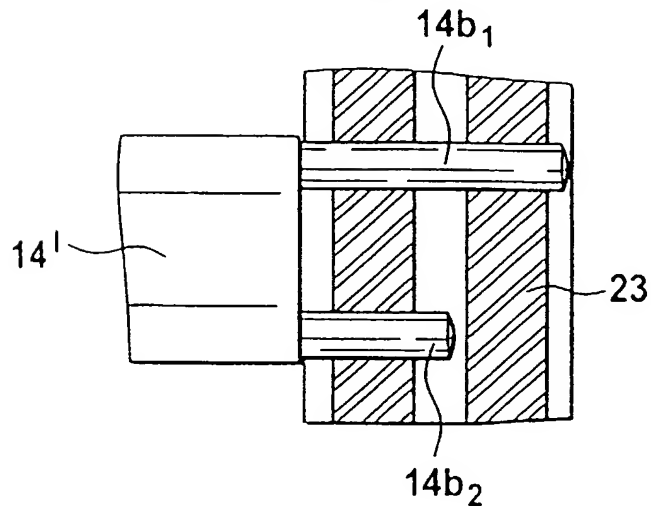


Fig. 6a

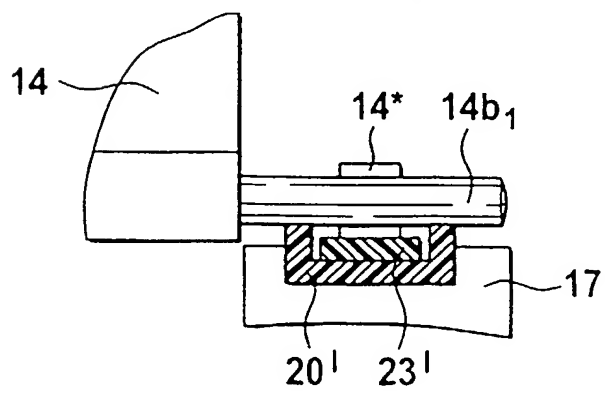


Fig. 6b

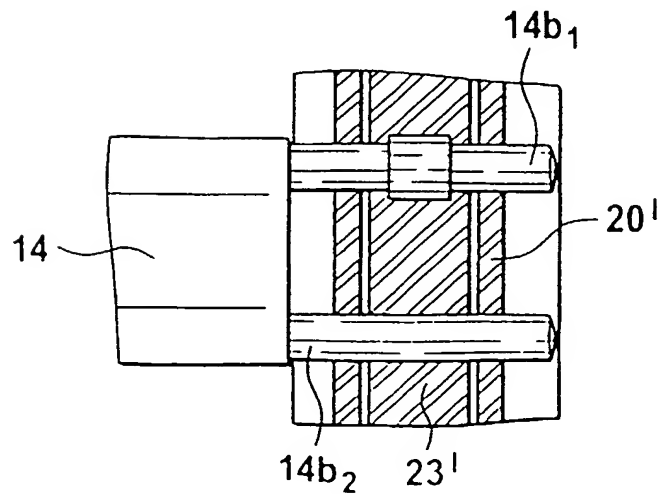


Fig. 7

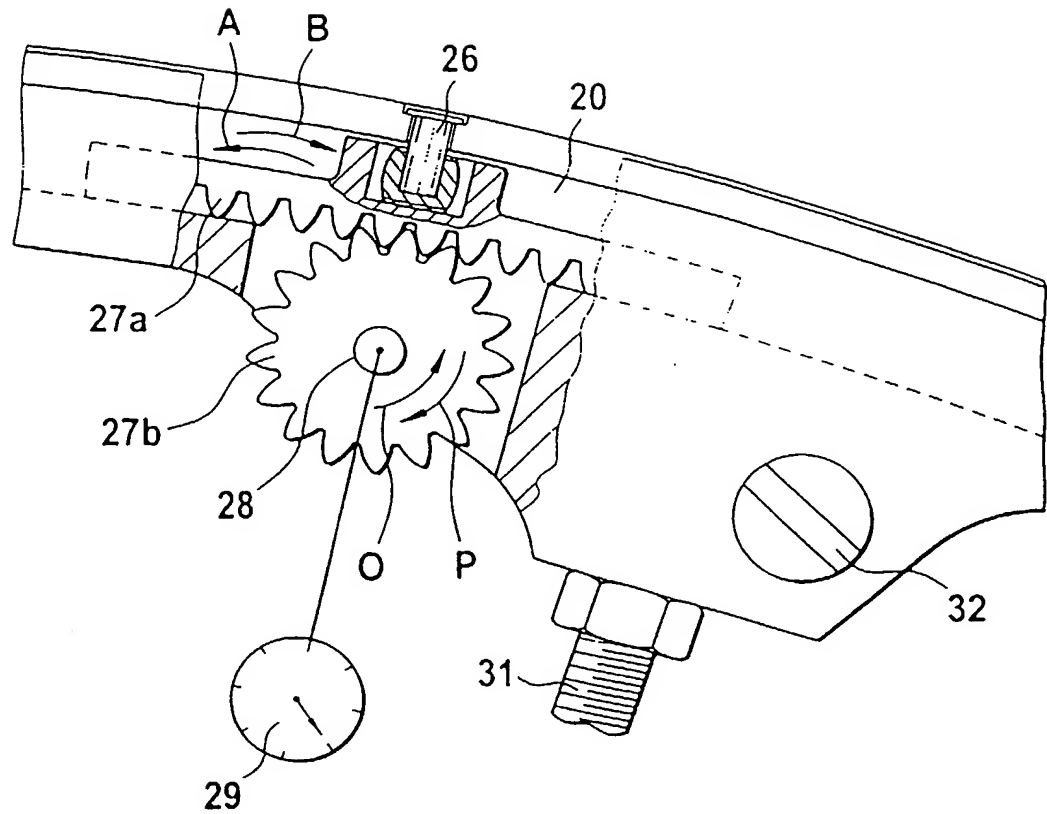
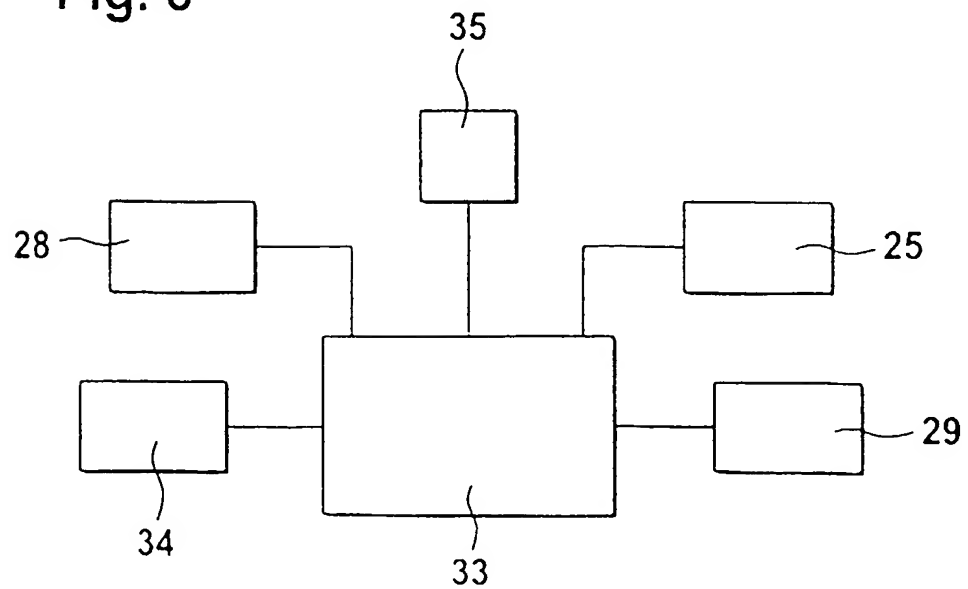


Fig. 8



- 1 -

Arrangement at a carding machine for textile fibres  
comprising clothed card top bars

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The invention relates to an arrangement at a carding machine for textile fibres, e.g. cotton, synthetic fibres and the like, comprising clothed card top bars.

10 In a known arrangement there is a spacing between the tips of the card top clothings and the tips of the cylinder clothing, and the card top clothings form an adjustable angle with the cylinder clothing, the ends of the card top bars each sliding with one portion on a first curved slideway and with another portion on a second curved  
15 flexible slideway, and the sliding surface of one slideway being radially displaceable.

In an arrangement described in WO 00/05441, an adjusting device for the localised displacement of the flexible second slideway is arranged centrally. Upon  
20 actuation, the second slideway is moved radially outwards or inwards relative to the cylinder. The adjusting device comprises a plurality of support elements that extend from a central support element and carry the second slide bend



in such a manner that the radial support elements expand or contract in reaction to the position of the adjusting device. The adjusting device can operate hydraulically or pneumatically. The known device is of complicated design. A further disadvantage is that the support elements engage the second slideway only at specific points. In particular it is troublesome that a uniform adjustment of the extremely narrow carding gap between the card top clothings and the cylinder clothing, e.g. 4/1000", is not possible. A non-uniform carding gap results in impaired quality of the fibre products produced, e.g. sliver and yarn, and can result in damage to the machine.

It is an aim of the invention to provide an arrangement of the type described at the beginning that avoids or mitigates the mentioned disadvantages, and in particular enables a uniform and accurate adjustment of the angle between the clothings of the card top bars and the cylinder clothing to be made in a constructionally simple manner in a short period of time.

The invention provides an arrangement at a carding machine for adjusting the positioning of card top bars relative to the clothing of the carding cylinder, having a

first curved slideway and a second curved slideway, the ends of the car top bars being slidably movable with a first portion on the first slideway and a second portion on  
5 the second slideway, wherein the second slideway is displaceable in the circumferential direction relative to the carding cylinder and is of tapered configuration in the circumferential direction.

By means of the measures according to the invention,  
10 it is possible in a simple and time-saving manner to achieve precise and uniform adjustment of the angle between the card top bar clothings and the cylinder clothing. It is further advantageous that the adjustment of a narrow carding gap is possible; the narrower the carding gap, the  
15 better is the carding action. Moreover, as a result of the longitudinal displacement of the second slideway, a minute radial displacement of the sliding surface is possible, so that the angles can also be altered by a small amount and as a result an optimum carding action can be achieved.

20 Advantageously the slideways are arranged adjacent to one another on one side of the carding machine. Preferably the second slideway is integrated into the first slideway, for example, the second slideway is mounted within the

first slideway. Advantageously in an arrangement in which two pin-shaped slide elements are present at each card top end, the slide elements have at least partially different cross-section and/or diameter. Preferably the second slideway is flexible. Advantageously the second slideway is displaceable in the circumferential direction relative to the cylinder and is wedge-shaped. Preferably the angle ( $\alpha$ ) opens out counter to the direction of rotation of the cylinder. Advantageously the card top bar is rotatable about a longitudinal axis of rotation. Preferably there is a displacement device for the localised displacement of the slideway. Advantageously the displacement device is associated with a drive device, e.g. a motor. Preferably the displacement device comprises adjustment elements, e.g. toothed wheel, toothed rod or the like. Advantageously the motor for the displacement of at least one slideway is connected to an electronic control and regulating device, e.g. microcomputer. Preferably a switch element for actuating the drive device is connected to the electronic control and regulating device. Advantageously an input element for the predetermined angle is connected to the electronic control and regulating device. Preferably -

starting from a zero position - a predetermined spacing between the tips of the clothing of the card top bars and the tips of the cylinder clothing can be set.

The invention also provides an arrangement at a  
5 carding machine for textile fibres, e.g. cotton, synthetic fibres and the like, comprising clothed card top bars, in which arrangement there is a spacing between the tips of the card top clothings and the tips of the cylinder clothing, and the card top clothings form an adjustable  
10 angle with the cylinder clothing, the ends of the card top bars each sliding with one portion on a first curved slideway and with another portion on a second curved flexible slideway, and the sliding surface of one slideway being radially displaceable, wherein the second slideway is  
15 displaceable in the circumferential direction relative to the cylinder and is wedge-shaped.

Moreover, the invention provides a method of adjusting the inclination of card top bars relative to the clothing of a carding cylinder, comprising positioning the card top  
20 bars opposed to the carding cylinder with a first portion on a first slideway and a second portion on a second slideway, the second slideway being of tapered cross-section in the circumferential direction, and displacing

the second slideway circumferentially so as to raise or lower the second portion of the card top bar relative to the first portion of the card top bar.

5        Certain embodiments of the invention will be explained hereinafter in greater detail with reference to the accompanying drawings, in which:

Fig. 1        is a diagrammatic side view of a carding machine with which an arrangement according to the invention may be associated;

10

Fig. 2        is a side view of a part of the card top and shows card top bars and a portion of the first slideway of a two-part slideway and a flexible bend;

15

Figs. 3a, 3b are partial side views of the card top of Fig. 2 and show the adjustment of the angles between the card top clothings and the cylinder clothing before alteration (Fig. 3a) and after alteration (Fig. 3b) with displacement of the sliding surface of the second slideway;

20

Fig. 4a       is a side view of a card top with the flexible bend and the revolving card top

with displaceable wedge-shaped second  
slideway and card top bars in a first  
position;

5        Fig. 4b    shows the arrangement according to Fig. 4a,  
                 with the second slideway displaced in  
                 direction A and card top bars displaced  
                 radially in direction E;

                 Figs. 5a, 5b are a front view and plan view,  
10                respectively, of another embodiment of the  
                 arrangement according to the invention;

                 Figs. 6a, 6b are a front view and plan view,  
                 respectively, of a further embodiment of the  
                 arrangement according to the invention;

15        Fig. 7    is a side view, partly in section, of a  
                 displacement device for the second slideway  
                 and a presetting device; and

                 Fig. 8    is a block diagram of an  
                 electronic control and regulating device.

20        With reference to Fig. 1, a carding machine, e.g. a  
                 (high-performance) carding machine known as a DK 903 (trade  
                 mark) and made by Trützschler GmbH & Co. KG, having a feed  
                 roller 1, feed table 2, lickers-in 3a, 3b, 3c, cylinder 4,

doffer 5, stripper roller 6, nip rollers 7, 8, web guide  
element 9, sliver funnel 10, delivery rollers 11, 12,  
revolving card top 13 with card top bars 14, can 15 and can  
5 coiler 16. The directions of rotation of the rollers are  
indicated by curved arrows. M denotes the central point  
(axis) of the cylinder 4. 4b indicates the direction of  
rotation of the cylinder 4. The carding machine of Fig. 1  
may include the arrangement according to any of Figs. 2 to  
10 6 below.

In the embodiment of Fig. 2, on each side of the  
carding machine at the side of the machine frame there is  
attached a flexible bend 17 by means of screws 32 (see Fig.  
7). The flexible bend 17 has a plurality of adjusting  
15 screws 31 (see Fig. 7). The flexible bend 17 has a convex  
outer face 17a and an underside 17b. Above the flexible  
bend 17 there is a first slideway 20, e.g. made from  
slideable plastics, which has a convex outer face 20a and a  
concave inner face 20b. The arrangement also includes a  
20 second slideway 23 (not shown in Fig. 2, but visible in  
Figs. 3a, 3b, 4a, 4b). The concave inner face 20b rests on  
the convex outer face 17a. The card top bars 14 each have  
at both their ends a card top head 14a, to which two steel

pins 14b are secured in the axial direction, which steel pins slide on the convex outer face 20a of the slideway 20 in the direction of arrow C. The card top clothing 14d is attached to the underface of the carrier body 14c. 21 denotes the circle formed by the tips of the card top clothings 14d. The cylinder 4 has around its circumference a cylinder clothing 4a, e.g. sawtooth clothing. 22 denotes the circle formed by the tips of the cylinder clothing 4a. 10 The spacing between the tip circle 21 and the tip circle 22 is denoted by a and is, for example, 0.20 mm. The spacing between the convex outer face 20a and the tip circle 22 is denoted by b. The radius of the convex outer face 20a is denoted by  $r_1$  and the radius of the tip circle 22 is denoted 15 by  $r_2$ . The radii  $r_1$  and  $r_2$  intersect one another in the central point M (see Fig. 1) of the cylinder 4.

Figures 3a and 3b show (in exaggerated form) the alteration of the angle  $\alpha$  between the card top clothings 18a, 18b, 18c and the tangent to the cylinder clothing 4a with radial displacement of the sliding surface 23a of the second slideway 23. Referring to Fig. 3a, the pins 14b<sub>1</sub>, 14b<sub>3</sub> and 14b<sub>5</sub> rest on the sliding surface 23a of the second 20



slideway 23, and the pins 14b<sub>2</sub>, 14b<sub>4</sub> and 14b<sub>6</sub> rest on the sliding surface 20a (not shown) of the first slideway 20 (not shown). The spacing between the sliding surface 23a and the tip circle 22 of the cylinder clothing 4a is denoted by  $c_1$ . According to Fig. 3b, the sliding surface 23a has been displaced outwards in the direction of the radius  $r_5$ , the spacing between the sliding surface 23a and the tip circle of the cylinder 4a being denoted by  $c_2$ . (The spacing  $c_1$  in Figs. 3a, 3b corresponds to the spacing  $b$  in Fig. 2). In that manner, the pins 14b<sub>1</sub>, 14b<sub>3</sub> and 14b<sub>5</sub> are spaced further away from the cylinder clothing 4a than the pins 14b<sub>2</sub>, 14b<sub>4</sub> and 14b<sub>6</sub>. As a result, in the case of each card top bar the tip circle 21 of the card top clothing 18a, 18b and 18c is at an angle  $\alpha$ , e.g.  $0^\circ 55'$ , relative to the associated tangent  $T$  to the tip circle 22 of the cylinder clothing 4a. The card top bars 14 are positioned at an angle. The angle  $\alpha$  opens out counter to the direction of rotation 4b of the cylinder 4.

In Figs. 4a and 4b, the displacement of the wedge-shaped second slideway 23, for example made from slideable plastics, on the flexible bend 17 is shown in the direction of arrow A. As a result of the displacement, for example

by 50 mm, the spacing  $c$  between the pins  $14b_1$ ,  $14b_3$  and  $14b_5$  and the cylinder clothing  $4a$  is increased. As a result of the fact that the wedge-shaped slideway  $23$  is displaced in direction  $A$ , the pins  $14b_1$ ,  $14b_3$  and  $14b_5$  are raised from the position shown in Fig.  $4a$  in direction  $E$  to the position shown in Fig.  $4b$ . The card top bars  $14$  are moved slowly in direction  $C$  between the card top turning roller  $13a$  and the card top turning roller  $13b$  by means of a drive belt (not shown), and are then turned and subsequently passed back on the other side.  $r_3$  denotes the radius of the convex outer face  $17a$  of the flexible bend  $17$ , and  $r_4$  denotes the radius of the concave inner face  $23b$  of the slideway  $23$ . The card top turning rollers  $13a$ ,  $13b$  rotate in the direction of arrows  $H$  and  $I$ , respectively.

Figs.  $5a$  and  $5b$  show the card top head located at the other (second) end of the card top bar  $14'$ . The end face of the pin  $14b_1$  is spaced further away from the end face  $14d$  of the card top bar  $14'$  than the end face of the pin  $14b_2$ ; the pin  $14b_1$  projects further out of the carrier body  $14c$  (card top rear) of the card top bar  $14'$  than does the pin  $14b_2$ . The first slideway  $20$  and the second slideway  $23$  are arranged adjacent to one another (spaced from one another)

in a longitudinal groove of the flexible bend 17. The pin 14b<sub>1</sub> (shown by way of example) runs on the sliding surface 23a of the second slideway 23 (wedge strip) which alters  
5 the angle of adjustment  $\alpha$ . The pin 14b<sub>2</sub> (shown by way of example) runs on the sliding surface 20a of the first slideway 20.

In the embodiment of Figs. 6a, 6b, the second slideway 23' is arranged in a longitudinal groove in the first  
10 slideway 20'. The pin 14b<sub>1</sub> (shown by way of example) is modified, for example by a cylindrical casing 14\* or the like, that has a larger outer diameter than the outer diameter of the core of the pin 14b<sub>1</sub>.

Fig. 7 shows a displacement device for displacing a  
15 slideway. A catch element 26 is attached to the slideway 23, which catch element is connected to a toothed rod 27a, in which there engages a toothed wheel 27b that is rotatable in the direction O, P and is driven by a drive device 28, for example a reversible motor, as a result of  
20 which the slideway 23 can be displaced in the direction of arrows A, B. Connected to the drive device 28 is a presetting device 29, by means of which a desired spacing c<sub>2</sub> (see Fig. 3b) and thus a desired angle of adjustment  $\alpha$  can

be preset (desired value). The adjustment can also be effected by means of an electronic control and regulating device 33 (see Fig. 8) having a desired value memory and/or  
5 input device.

Fig. 8 shows a control device for an arrangement according to the invention. The device has an electronic control and regulating device 33, for example a microcomputer, to which there are connected an input device  
10 34 for the desired spacing  $c_2$  and/or angle of adjustment  $\alpha$ , the drive device 28, the display device 25, the presetting device 29 and a switch element 35.

Claims

1. An arrangement at a carding machine for adjusting the position of card top bars relative to the clothing of the carding cylinder, having a first curved slideway and a second curved slideway, the ends of the card top bars being slidably movable with a first portion on the first slideway and a second portion on the second slideway, wherein the second slideway is displaceable in the circumferential direction relative to the carding cylinder and is of tapered configuration in the circumferential direction.
2. An arrangement according to claim 1, in which the first and second slideways are arranged adjacent to one another on one side of the carding machine.
3. An arrangement according to claim 1 or claim 2, in which the second slideway is integrated into the first slideway.
4. An arrangement according to any one of claims 1 to 3, in which at each card top end there are two pin-shaped slide elements.

5. An arrangement according to claim 4, wherein the slide elements are at least in part of different cross-section and/or diameter.
- 5 6. An arrangement according to any one of claims 1 to 5, in which the second slideway is flexible.
7. An arrangement according to any one of claims 1 to 6, which is such that the card top bars can be positioned at an angle that opens out counter to the direction of rotation of the cylinder.
- 10 8. An arrangement according to any one of claims 1 to 7, in which the top card bar is rotatable about a longitudinal axis of rotation.
9. An arrangement according to any one claims 1 to 8, in which there is a displacement device for the localized displacement of the second slideway.
- 15 10. An arrangement according to claim 9, in which the displacement device is associated with a drive device, for example, a motor.
- 20 11. An arrangement according to claim 9 or claim 10, in which the displacement device comprises at least one adjustment element, for example, toothed wheel, toothed rod or the like.

12. An arrangement according to any one of claims 9 to 11, in which the motor for the displacement of at least one slideway is connected to an electronic control and regulating device, for example, microcomputer.
13. An arrangement according to claim 12, in which a switch element for actuating the displacement device is connected to the electronic control and regulating device.
14. An arrangement according to claim 12 or claim 13, in which an input element for a predetermined angle of inclination of the card top bars is connected to the electronic control and regulating device.
15. An arrangement according to any one of claims 1 to 14, in which, starting from a zero position, a predetermined spacing between the tips of the clothing of the car top bars and the tips of the cylinder clothing can be set.
16. An arrangement according to any one of claims 1 to 15, in which there is a second, displaceable and circumferentially tapered slideway on each side of the carding machine.

17. An arrangement at a carding machine for textile fibres, e.g. cotton, synthetic fibres and the like, comprising clothed card top bars, in which  
5 arrangement there is a spacing between the tips of the card top clothings and the tips of the cylinder clothing, and the card top clothings form an adjustable angle with the cylinder clothing, the ends of the card top bars each sliding with one  
10 portion on a first curved slideway and with another portion on a second curved flexible slideway, and the sliding surface of one slideway being radially displaceable, wherein the second slideway is displaceable in the circumferential direction  
15 relative to the cylinder and is wedge-shaped.
18. An arrangement at a carding machine for adjusting the inclination of card top bars, the arrangement being substantially as described herein with  
reference to and as illustrated by any one of Figs.  
20 1, 2, 3a and 3b, 4a and 4b, 5a and 5b, 6a and 6b, 7 and 8.
19. A carding machine comprising an arrangement according to any one of claims 1 to 18.





INVESTOR IN PEOPLE

Application No: GB 0202764.7  
Claims searched: 1-19

Examiner: Ben Widdows  
Date of search: 7 June 2002

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): D1N

Int Cl (Ed.7): D01G 15/28 15/30

Other: Online: WPI, EPODOC, JAPIO

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2339804 A (TRUETZSCHLER) see abstract and figs with slideways 20,25&26	1,3,4,6,8, &15
A	GB 2320260 A (TRUETZSCHLER) see figs	
A	EP 1178136 A (RIETER) see abstract	

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